Peas

ATLANTIC PROVINCES VEGETABLE CROPS GUIDE TO PEST MANAGEMENT 2002 - 2003

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Introduction

The pea is a member of the Leguminosae (legume family). *Pisum sativum* originated somewhere in the Eastern Mediterranean region and Near East. In Switzerland seeds have been found dating back to about 7000 BC. This crop was grown by the Greeks and Romans. In England it was an important crop in the 11th century. During the course of cultivation some became grown as a vegetable, some for seed and some for fodder. More recently edible podded types have been developed. Peas are viny annual herbs being either determinate (bush type) on indeterminate (climbing type).

Minimum germination occurs at soil temperatures in the 4&deg to 6&degC range, optimum germination occurs at 16&degC to 18&degC. High soil temperatures lead to poor emergence. The best growth occurs when air temperatures are in the 15&deg to 18&degC range. High summer temperatures at flowering time are detrimental and cause yield reduction. It is, therefore, important to plant early so that maturity is reached for most of the crop prior to high summer temperatures. Pea maturity is closely related to the number of growing degree days above 5&degC accumulated from planting time. Cultivar differences range between 1200 to 1800 degree days. Before bloom, the crop can withstand some frost but the flowers and pods are susceptible to freezing conditions. A regular water supply promotes high

yields but excessive rainfall induces root rot.

Peas require fertile and well drained soil. Sandy loams and loams well supplied with organic matter are best suited. Fields with excessive slopes should be avoided since peas do not offer much protection against soil erosion early in the season.

Pea seeding occurs from early April to late May. Harvesting for early and processing markets begins in early July. Yields vary between 2200 and 5500 kg per hectare, on a shelled basis and 4400 to 8800 kg per hectare on an unshelled basis.

Presently peas are grown for processing, fresh wholesale and direct to consumer markets. Markets are potentially available for production of specialty crops, like edible podded peas. These markets are limited due to the requirement for handpicking though the market demand is high.

Nutrient Content: Excellent source of thiamine; good sources of Vitamin A and C, and folate, plus several minerals including iron, calcium and potassium. A 250 mL (1 cup) serving provides 121 kilocalories.

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Seed Treatment - Inoculate the seed with a commercial Rhizobium culture where no application of bacteria has been made to the field in the past or where the nitrogen application is low.

Seeding/Planting - Seed as early as possible. Seedlings are frost resistant. The market season can be extended by a succession of seedings of one cultivar, or by seeding early, mid-season, and late cultivars at about the same time. The latter method is better since early cultivars do not yield well when sown late. Processing companies schedule seeding on the basis of heat units. Depending on the moisture, seed peas from 1 to 4 cm deep. Largest yields result from rows sown 17 cm apart and 5 cm apart within the row. This may be less convenient in market garden crops. Such spacings require 250 to 400 kg per hectare, depending on the seed size and percentage of germination. Light rolling firms soil around the seed and encourages quick uniform germination. It is also necessary for mechanical harvest as it presses stones into the soil. It also levels the soil surface in preparation for application of herbicides.

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Irrigation - may be practical on this crop and significant yield increases may result from timely application. Field selection is critical in this crop as disease control by rotation must be accomplished. Choosing suitably drained fertile fields is also essential. Heavy rolling or packing is likely to reduce fertilizer uptake and pea root nodulation, and to increase the number of plants affected by root rot.

Nutrition ▲ to Top

ALL ADDITIONS OF LIME AND FERTILIZER OR MANURES SHOULD BE

BASED ON RECOMMENDATIONS FROM A SOIL TEST.

Peas are generally considered to be a low fertility crop which do well on a fertile soil. Peas which receive granular fertilizers tend to remain in the fancy grades longer than in those crops that are poorly fertilized. Moderate amounts of manure may be used but avoid high applications.

Lime - Lime must be applied to maintain the soil pH in the range 6.0 to 6.5. Yield response to lime is high with this crop.

Nitrogen - Sufficient nitrogen keeps peas immature and results in peas remaining in fancy grades longer than on poorly fertilized soils. Low rates of nitrogen are required. When no phosphorus and potash is recommended then nitrogen also may be omitted.

Phosphorus - Usually some phosphorus is required in relatively small amounts.

Potash - This can be applied before planting and disked into the soil. Otherwise it must be banded far enough from the seed so that fertilizer burn does not occur.

Calcium - Limestone banded with the seed on low pH soils may be applied at 330 to 440 kg per hectare to potentially increase yields.

Sulfur - On soils low in organic matter and heavily cropped consider the application of gypsum.

Fertilizer Application - Either broadcast fertilizer and seed separately to avoid burning the seed or band 5 cm below and 5 cm to the side of the seeded row.

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Weed

There are several effective preplant incorporated, preemergence and postemergence herbicides available for use on peas. Preemergence treatments provide good control of annual broadleaf weeds. When a heavy annual grass infestation is anticipated a preplant incorporated treatment should also be used. Postemergence treatments are available for both grass and broadleaved weed control. The timing of postemergence treatment is critical for the control of some species and control may be poor if applications are not properly timed.

Diseases

Damping-off (fungi)

Characteristics: Damping-off occurs in seedlings which may topple over and die because of decay at the soil line. Surviving seedlings may be stunted because of a rot on the roots. Damping-off tends to be more severe when soil moisture is high and soil temperatures are in the range of 18 to 24&degC.

Control: Control is improved by planting seeds of high vigor.

Root Rot (fungi)

Characteristics: The taproot shows various surface discolorations of reddish brown or dark brown and smaller roots may be rotted away.

Control: Root Rot is caused by a complex of several soil borne organisms. It is present in every soil and nearly all plants have some degree of root rot. In seriously infected fields long rotations of 6 years or more are necessary. Pea refuse should always be placed in areas where peas will not be grown. Any pea refuse left on the field should be turned under deeply by fall plowing. Plant only on well drained, well fertilized soils. No resistant cultivars are available and there are no feasible chemical controls. An adequate supply of nutrients and moisture may enable infected plants to stay alive and produce an acceptable, though reduced crop. Green manures are beneficial in the rotation to reduce the potential of root rot.

Botrytis Rot or Gray Mold (fungus)

Characteristics: This fungus may cause severe defoliation of the lower leaves and rotting of the stems in wet seasons. Infected leaves appear fuzzy and shrivel as the infection progresses. Tips of young pods are attacked which develop small tan water-soaked lesions. These spots expand and destroy the entire pod.

Control: Plant on well drained soils. Plow down refuse immediately following harvest. Don't over fertilize with nitrogen.

Sclerotinia Rot (fungus)

Characteristics: Watery lesions develop on any plant parts that are not exposed to air circulation. A fluffy white growth develops and affected areas become slimy.

Control: Plant on well drained soil not recently used for soybeans, clover, beans, lettuce, tomatoes, carrots, parsnips, cucumbers, celery, or cabbage. Practice a 3-year rotation. Serious losses result when susceptible crops are grown for several consecutive years. Do not apply excess irrigation. Cultivate and pick when plants are dry. Avoid fields with a history of Sclerotinia. Plow plant refuse down immediately after harvest. Do not over fertilize with nitrogen.

Pod Spot and Ascochyta Blight (fungi)

Characteristics: Symptoms develop on stem, roots, leaves and pods. Black to purplish streaks on stems reaching from the root zone to about 25 cm up the stem. Leaf spots are gray-purplish. Pod spots are gray-purplish and are sunken.

Control: Use disease free seed. In the absence of disease free seed, severely infected seed should be held over. The level of infestation drops to one-third of its original level when seed is held over for one year. Pea refuse should be disked and plowed under immediately after harvest.

Mosaic and Streak (viruses)

Characteristics: Virus diseases are transmitted by aphids. Symptoms include misshapen, discolored leaves, stems and pods.

Control: Use disease free seed. Resistance is bred into many cultivars.

Insects

Seedcorn Maggot

Characteristics: The larva (maggot) of the seedcorn maggot is 5 mm long and pale in color. The damage is caused by the maggot burrowing into the seed, often destroying the embryo. Damaged seed will either not germinate or produce a deformed plant. One generation may be as short as three weeks. The adult seed corn maggot fly deposits her eggs on the seed or plantlet. Seed corn maggot are attracted to soil where there is an abundance of decaying vegetable matter or manure. Cool wet weather that delays germination is favourable to seed corn maggot.

Control: Plant as shallow as needed in a well prepared seedbed. Early germination is necessary to get good plant stands and prevent injury. Later planted crops are not as susceptible to this pest. Good weather conditions are necessary to completely control the pest. Avoid planting susceptible crops in fields very recently manured. Chemical seed treatment is essential.

Pea Moth

Characteristics: The small brown Pea Moth emerges about the time the peas are in bloom. Eggs are laid singly on the pods and plant parts. The tiny larva enters the pod after hatching. The larva feeds on the developing peas inside undetectable from the outside. The fully grown larvae overwinters in a silken cocoon in the soil. They are not usually a problem in commercial fields.

Control: Early planting of peas will avoid the egg laying period. After harvest remove vines or deep cultivate. Insecticide may be applied at first bloom.

Aphids

Characteristics: Aphids are small, soft-bodied, slow-moving insects. They are often found in large colonies on the undersurface of leaves. A colony consists of winged and wingless adults and various sizes of nymphs. Aphids may be black, yellow or pink, but mostly are various shades of green. Aphids feed by sucking plant sap. Saliva injected while feeding may carry plant viruses or may be toxic to the host plant. Feeding by large numbers discolors foliage, curls leaves and damages developing buds. The plants may be covered by a sticky substance, called honey dew, which is excreted by the aphids.

Control: The Five-Spotted Lady Beetle and the Seven-Spotted Lady Beetle are helpful predators of aphids. Apply an insecticide only when aphid population is

high.

SPECIFIC CHEMICAL CONTROLS FOR THE VARIOUS CROP PESTS DISCUSSED ARE FOUND IN "GUIDE TO PEST MANAGEMENT" FOR VEGETABLE CROPS.

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Processing Peas: Approximately three weeks following full bloom, peas are ready for harvest. Quality of peas deteriorate with maturity. Hot dry weather during harvest speeds up maturity without corresponding increases in yield. Soils adequately supplied with nitrogen and/or organic matter result in increases in yield and mature less rapidly than those lacking sufficient amounts of these nutrients. For this reason peas produced on fertile soils remain at peak quality for a longer period, thus providing a greater opportunity for orderly harvest of peas.

Transportation to the processing plant and processing should be immediate so this limits distance peas can be grown from the processing plant.

Green Peas: The pods are harvested when they are well filled, but still succulent, before they harden and fade in color. The peas should not be hard and starchy. Peas are best picked and shelled just before cooking as the sugar content decreases rapidly after harvest. Two or three pickings are made as all the pea pods do not mature at the same time. The pods should be carefully pulled from the vine to prevent the plants from being uprooted. At the last harvest, the plant may be pulled up and all the pods picked.

Edible Podded Peas: These peas are picked when the pods are long and the peas just developing. Pods, three to five inches long, are produced five to seven days after flowering, and the pea seeds are slim and small. Pods need to be picked every other day to prevent them from developing large seeds and fibrous pods. If the seeds develop, they may be used similar to garden peas.

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Unshelled peas can be held a week or two if cooled to 0&degC immediately after harvest, and held at 0&degC with a relative humidity of 95%. Peas can be hydrocooled or wetted and vacuum cooled to remove field heat. Package ice is effective in keeping peas cold and minimizing wilting.

Bibliography ▲ to Top

(See also General References)

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PEST	PESTICIDE (Formulation)	RATE Product	DAYS TO HARVEST	REMARKS ▲ to Top
Weeds ▲ to Top				
Preplant Perennial Weeds including quackgrass	ROUNDUP 356 Sn	2.5 to 7.0 L/ha	-	Apply in the fall or spring prior to planting. Annual weed control programs will be necessary to control weeds germinating after planting. For quackgrass control apply to actively growing quackgrass when at least 4 new leaves are present. The low rate (2.5 L/ha) will provide a minimum of one season control, while higher rates (4.75 to 7 L/ha) will provide longer term control. The low rate of Roundup should be applied in 50 to 100 L/ha water. If higher water volumes are used add a suitable surfactant. Wait 72 hours before plowing under. Best control of quackgrass is obtained when these herbicides are applied in the fall.
	TOUCHDOWN 480	2.5 to 7.0 L/ha	-	
	GLYFOS	2.5 to 7.0 L/ha	-	
	ROUNDUP TRANSORB	2.5 to 7.0 L/ha	-	
Preplant incorporated germinating annual grasses and some broad leaves	TRIFLURALIN:			Incorporate within 8 hours of application following label instructions. Ragweed and mustards are not controlled. Corn or cereal grains may be injured when planted in fields treated with trifluralin the previous year.
	TREFLAN 480 EC	1.25 to 1.7 L/ha	-	
	RIVAL 60 DF	1.0 to 1.3 kg/ha	-	
	BONANZA 400	1.5 to 2 L/ha	-	
	PURSUIT 240 Sn	0.312 L/ha	60	Some rotational crop restrictions. Apply only to processing peas.
Preemergence treatments Germinating	GESAGARD 80 WP	2.25 to 2.75 kg/ha	-	Preemergence to crop and weeds. Will not control triazine tolerant weeds.
	DINOSEB PTK	20.4 to 26.4	-	Preemergence to crop and weeds. **Not**

broadleaf weeds and some grasses	300 EC	L/ha		**legal for use in New Brunswick.** Reduce application rate to 13.2 L/ha when applied immediately before emergence.
	PURSUIT 240 Sn	0.312 L/ha	60	Apply only to processing peas, some rotational crop restrictions apply.
Postemergence treatments Emerged broadleaf weeds	BASAGRAN 480 Sn plus CITOWETT PLUS or ASSIST	1.75 to 2.25 L/ha plus 0.25 L/100 L or 1 to 2 L/ha	- -	Apply postemergence when peas have 3 pairs of leaves and when weeds are small. No residual activity. A second application can be made. Use 1 L/ha of Assist under hot humid conditions.
	BASAGRAN FORTE L	1.75 to 2.25 L/ha	-	No adjuvant needed when applying Basagran Forte.
	MCPA-Na-300	0.9 to 1.5 L/ha	-	This rate may not provide satisfactory control of heavy weed populations. Some injury may occur but crop recovery is usually satisfactory. Check MCPA-Na 300 labels for proper rates as they vary depending upon the product purchased. Apply only when crop is at the correct growth stage and is not under stress.
	MCPA-AMINE 500	0.3 to 0.5 L/ha	-	
Postemergence Seedling annuals, broadleaf weeds and Canada thistle	TROPOTOX PLUS	2.75 to 4.25 L/ha	-	Apply when the peas have 3 to 6 expanded leaves and apply in 150 to 200 L of water/ha.
Emerged annual grass	EXCEL SUPER	0.67 L/ha	75	Apply to actively growing annual grasses in the 1 to 6 leaf stage.
	HOE-GRASS 284 EC	2.5 L/ha	60	For postemergence control of grasses in the 2 to 3 leaf stage, including volunteer corn.
	POAST 184 EC plus MERGE or ASSIST	0.8 to 1.6 L/ha 1 L/ha 2 L/ha	60 for dry peas/ 30 for processing peas	FOR PROCESSING AND DRY PEAS ONLY. Apply postemergence to annual grasses in the 1 to 6 leaf stage. Use the higher rate to control volunteer cereals. Do not use on fresh edible pods.
Emerged quackgrass	POAST 184 EC plus MERGE or ASSIST	2.7 L/ha 2 L/ha 4 L/ha	60 for dry peas/ 30 for processing peas	FOR PROCESSING AND DRY PEAS ONLY. Apply at 1 to 3 leaf stage of actively growing quackgrass. Do not use on fresh edible pods.
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Seedcorn maggot			-	See - "Seed Treatment".
Pea moth	MALATHION 500 EC	2.0 L/ha	3	

	MALATHION 50 WP	4.25 kg/ha	3	
Aphids	PIRIMOR 50 WP	150 to 275 g in 17 L of water per ha by airplane	6	Use high rate when aphid population is high or during very cool weather.
	PIRIMOR 50 DF		6	
	MALATHION 500 EC	2.0 L/ha	3	Do not apply in bloom. Obtain thorough coverage. Repeat as necessary.
	MALATHION 50 WP	4.25 kg/ha	3	
	CYGON 480 EC	275 to 425 ml/ha	3	Obtain thorough coverage. Repeat as necessary.
	DIMETHOATE 480 EC	275 to 425 ml/ha	3	
	LAGON 480	275 to 425 ml/ha	3	
	DI-SYSTON 15 G	7.5 to 17.5 kg/ha	50	Apply by drilling or broadcasting at planting.
	LANNATE L	2.25 L/ha	1	
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Powdery Mildew	KUMULUS 80 DF	1.5 kg/ha	1	Spray at first appearance of disease and repeat at 7 to 10 day intervals as necessary.
	MICRO-NIASUL 92% WP	1.5 kg/ha	1	